CV. *Medical and Chemical Obſervations upon Antimony.* *By* John Huxham, *M. D. F. R. S.*

Read Dec. 5, 12, 19, 1754.

NOT above two centuries ago, a phyſician, who preſcrib'd antimonials, was expelled the faculty; nay, at Rome, any one, who uſed Pulvis Cornachini, incurred the penalty of being ſent to the gallies, on account of the antimonium diaphoreticum, that was in it. Now, on the contrary, antimony, in ſome form or other, is the grand catholicon, and uſed by dabblers, as well as doctors, in phyſic. It is without all doubt a moſt excellent mineral, when duly prepared, and judiciouſly adminiſtered.

But whoever would give antimonial medicines with ſafety and ſucceſs, ſhould be well acquainted with the analyſis of that mineral, and its component principles; ſhould know what different combinations, preparations, and doſes of them, will affect: otherwiſe it may prove a poiſon, inſtead of a remedy. For who would imagine, without ſufficient experience, that ſix or eight grains of the liver or regulus of antimony, and even a much leſs quantity of its glaſs, will cauſe the moſt violent vomitings; whereas a drachm or more of the crude, or common depurated antimony of the ſhops may be taken with eaſe and ſafety? But further, if equal quantities of antimony and ſalt-petre are deflagrated and melted together, a very ſtrongly emetic liver of antimony is produced; and yet if three parts of that ſalt, and one of antimony are detonated and calcined in a proper fire, a mere inert calx, or antimonium diaphoreticum, as it is called, comes out, not in the leaſt emetic or cathartic. On the other hand, if only one-eighth of nitre had been fuſed with the antimony, a very mild kind of regulus medicinalis had been the conſequence. So likewiſe, if one part of ſalt of tartar is fluxed with five parts of crude antimony, a very gentle medicinal antimony, or, as more commonly called, regulus medicinalis, is prepared; and yet if two or three parts of fix'd alcali ſalt, and one of the ſame mineral, are melted together, a very draſtic kind of hepar antimonii, and commonly a ſmall quantity of regulus, enſue. Nay, antimony well roaſted, calcin'd, and then flux'd into a glaſs, without the addition of any other body, becomes the moſt virulent emetic in nature: but if this very glaſs is only calcined again by the concentrated rays of the ſun, through a large burning-glaſs, it is turned forthwith into an inactive calx, or a ſort of antimonium diaphoreticum. The ſame is effected by burning the vitrum antimonii with about an equal quantity of nitre.

Theſe are facts, which nothing but repeated experience could inform us of; and yet, however ſtrange they may appear, perhaps, when we come more nearly to examine the matter, we may pretty clearly diſcover the reaſon of them.

The caſe ſeems to be thus: Clean, crude antimony conſiſts of much ſulphur, and a conſiderably greater quantity of reguline metallic parts. The ſulphur, or at leaſt what may be called the external ſulphur, is little or nothing different from common ſulphur, as Helmont ſurmiſed, and Boerhaave, Hoffman, and Geoffroy, have evidently proved; and I think every one now allows it, however virulent the arſenical ſulphur of antimony, as they called it, was deemed by the antient chemiſts. And this ſulphur, like the common ſulphur, is compounded of a vitriolic acid, and a bituminous or inflammable ſubſtance: and whatever Baſil, Valentine, Charras, and others, talked of the vinegar of antimony, there is no other acid in it than what I have mentioned; nor is there any kind of ſalt in antimony but the vitriolic acid, notwithſtanding the conceit of Maets, Duncan Bornett, &c.

But however abundant the ſulphureous principle is in antimony, the reguline greatly exceeds it, and in truth conſtitutes the very body or eſſence of antimony, and in which alone reſides its draſtic power, and emetic quality, as is ſufficiently ſhewn by Monſieur Geoffroy, and of which, at preſent, I believe few chemiſts doubt; for there is no one preparation of antimony emetic, in which the reguline principle doth not greatly abound: therefore no tincture of antimony, made with rectified ſpirit of wine, is in the leaſt degree emetic.

This reguline ſubſtance, or antimony properly ſo called, is a metallic ſubſtance, *ſui generis*, almoſt totally volatile when urged by a very ſtrong fire, and can by no means, hitherto known, be brought to a malleable ſtate. One will have it of a mercurial, another of an arſenical nature; but it ſeems in ſeveral reſpects to differ from either. No pure running mercury can by any known method be drawn from regulus of antimony, or its flowers, with ſal ammoniac,

niac, whatever may have been boaſted by the alchymiſtical viſionaries. The exceeding ſmall quantity, that Monſieur Geoffroy fancied he extracted from it, could never be done again by the very ſame proceſs, materials, and the utmoſt care. Beſides, if the reguline part of antimony was really mercurial, how comes the mercury not to fly off intirely in a ſtrong calcination, eſpecially in ſuch an intenſe heat as that of the burning-glaſs? And if it doth ſo, as ſome have aſſerted, how comes the remaining calx, after ſuffering ſuch a violent action of the fire, to be ſo readily reduced to its priſtine reguline metallic ſtate, merely by the addition of any common phlogiſton, as ſulphur, charcoal-duſt, animal fat, or the like? But indeed mercury in no form will ſtand ſuch an intenſe heat, but is ſoon totally evaporated; and ſo would the regulus, if mercurial; the calx of which however, after having ſtood this fiery trial, is, as I ſaid, eaſily revived into a proper regulus. Pure antimony differs from arſenic in not having the leaſt garlick-ſmell, peculiar to arſenic when burnt. Nor is the antimonial regulus at all ſoluble in water, as arſenic, nor in oil of tartar *per deliquium*, in which however white arſenic almoſt intirely diſſolves. Moreover the conſtituent particles of arſenic and antimony are of quite different figures; the former reſembling two quadrilateral pyramids, join'd baſe to baſe; the latter like needles, as it were, and this particularly in the minuteſt diviſions of antimony by ſolution, ſublimation, *&c.* as is remarkably ſeen in the flowers of antimony *per ſe*, and in the ſolution of its regulus in wine, when viewed by a microſcope on a ſlip of glaſs, or the like: nay, when ſtibium is

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revived from the glaſs, or calx antimonii, it reſumes the ſpiculine or needle-like appearance; and when mercurius vitæ is flux'd without any addition, it becomes a ſpiculine regulus, or a mere maſs of ſuch aculei, or needles.

Indeed it ſeems to be from this ſpiculine or needle-like form (which is conſtantly retained by the minuteſt particles of the reguline ſubſtance), that antimonial preparations have their emetic quality. Thus ſaline bodies ſtimulate by their points, or edges; ſublimate corroſive by its ſalts actuated by the weight of the cohering mercury; arſenic by its rigid, ſharp-pointed, heavy particles. For when theſe reguline ſpicula are ſheath'd up in a large quantity of ſulphur, as in the crude antimony, they exert no ſuch power; and if regulus of antimony is melted up with pretty much ſulphur, it becomes quite as inert as the crude mineral. So regulus, or glaſs of antimony, melted with wax, is rendered exceedingly much milder than before. Nay, even the virulent quality of the ſtrongeſt white arſenic may be ſurprizingly taken off, by intimately uniting it with common ſulphur by fuſion.

It ſhould ſeem then, that this ſulphureous covering blunts or ſheaths up the points of theſe acrid bodies, and takes off the irritation, which they would otherwiſe cauſe on the nervous coats of the ſtomach and guts. This is plainly ſeen in the glaſs of antimony with melted wax; which, though in itſelf the moſt violent of all emetics, thus becomes infinitely more gentle, and may be given to adults from four, ſix, or eight grains, to ſixteen, with ſafety, and great advantage in ſome caſes; whereas two or three grains of the powder'd glaſs will excite moſt dreadful vomitings.

ings. But let me add, by the way, that if the vitrum ceratum antimonii, after it hath been long made, is afreſh rubbed to a fine powder, it proves much more draſtic, the wax being rubbed off from it, and leaving its points more naked: ſo that even this ſeems to prove what I juſt now hinted. Hartman's chyliſta, or the old preparation of glaſs of antimony with gum-maſtic, diſſolved in ſpirit of wine, and then evaporating the ſpirit, ſeems to be on the ſame foundation, but, I ſhould imagine, nothing near ſo ſafe: however, I never tried it, nor that other preparation of the vitrum antimonii, by the repeated deflagration of ſpirit of wine in it, which, Geoffroy ſays, may be given ſafely to ten or even twenty grains; the oleoſe part of the ſpirit of wine inveloping or blunting the ſtibiate ſpicula, and reducing the glaſs in ſome meaſure back again to its original antimonial ſtate. 'Tis certain the ſaline-mercurial preparations are rendered much milder by burning ſpirit of wine upon them repeatedly.

The leſs therefore of the external ſulphur adheres to the reguline part of antimony, the more vehement is its operation, and *vice verſa.* Thus in preparing the common liver of antimony, the nitre deflagrates with, and carries off, a great part of the ſulphur, whence the antimonial hepar becomes very ſtrongly emetic (I do not conſider at preſent what the alkalization of the nitre in the proceſs doth further). And 'tis much the ſame in making the common regulus; and, when filings of ſteel are uſed in preparing the martial regulus, it is, that the iron may abſorb the antimonial ſulphur. So likewiſe, in calcining antimony for the glaſs, the ſulphur is firſt driven off by roaſting, and then more perfectly by melting the reſiduum in a ſtrong fire into a glaſs, whence it acquires a moſt violently emetic power, which notwithſtanding is ſoon totally deſtroyed by re-melting it with much common ſulphur.

But although this groſs external ſulphur is not at all neceſſary to the conſtitution of the reguline, metallic part, an internal or metallic ſulphur appears abſolutely requiſite to the exiſtence of the regulus, as regulus; for when antimony is quite deprived of all its ſulphur, by what is called the humid or dry calcination, it ceaſes to be metallic or antimony. Thus antimony expoſed to the ſtrong concentrated rays of the ſun, becomes an abſolutely inert calx, or caput mortuum, and can never be reduced to its original nature and form, but by the addition of ſome ſulphureous body. The ſame happens, when large quantities of nitre are deflagrated with antimony, till the ſulphur is all burnt off, as in the common antimonium diaphoreticum. 'Tis thus alſo in the humid calcination, when ſtrong ſpirit of vitriol is poured on the reguline maſs, which it tears abroad, and lets looſe the phlogiſton; for this calx likewiſe is not reducible to regulus but by ſome ſulphureous pabulum, in cloſe contact and fuſion with it. The ſtrong ſulphureous ſmell of the oil of vitriol, when forced off by diſtillation, or the like, diſcovers the phlogiſton, and whence it came. Moreover this calx is intirely white, and will not in the leaſt deflagrate with ſalt-petre; an argument of the abſence of any ſulphureous matter. This calx however is ſoon alſo turned into a regulus by the addition of a proper ſulphur, and then deflagrates with nitre as uſual.

It appears then, that ſome internal metallizing ſulphur (perhaps however little or nothing different from the common external ſulphur), is abſolutely neceſſary to combine the metallic earth together, and even to give it the reguline conſiſtence and form, without which it lies an inactive incoherent heap, utterly devoid of any antimonial virtue. Thus the duſt, or minera, or aſhes of iron, are harmleſs, and may be ſwallowed ſafely; but if formed into knives, or needles, the caſe is infinitely altered. We not only ſee the neceſſity of this internal ſulphureous principle in the compoſition of antimony, but alſo in that of the more perfect metals, which, when calcin'd by the burning-glaſs (or otherwiſe) are not reducible into their proper metallic malleable ſtate, but by the addition of ſome kind of ſulphur, as a bond of union between the diſjoined particles of the reſpective metallic earths. But it is pretty remarkable, that let the ſulphur be animal, vegetable, or mineral, fat, coal-aſh, or brimſtone, it equally affects the coalition of the reſpective earths, and the regeneration of each of the different metals; ſo that it ſeems to be ſulphur, as ſulphur, that is only wanted in the recompoſition. In like manner as in vegetables, the conglutinating oil is neceſſary to the coheſion of the ſtamina, which being burnt off, they become a mere duſt. It ſeems alſo to argue, that the difference of metals lies in their different ſpecific metallic earths, as I may ſo call them, and not in the different proportion, combination, and purity of the ſulphureous and mercurial principles, as Monſieur Homberg, and others, have imagined. Alſo I know not how the ſulphur, of the very ſame charcoal, equally ſerves to re-vivify the aſhes not only of iron, copper, or tin, into their reſpective metallic forms and conſiſtence, but likewiſe even the calx of ſilver or gold. But further, if theſe metallic earths were indeed originally of a mercurial nature, and remain ſo after calcination, how comes their mercury to ſtand ſuch an immenſe heat as that of the burning-glaſs? whereas no known preparation of mercury, much leſs mercury itſelf, will ſtand a third part of the heat without being totally diſſipated, and for this reaſon mercurials, as mercurials, never can be vitrified: but theſe earths, or aſhes of metals, do ſtand this exceeding degree of heat, and are vitrifiable, and therefore not mercurial; and their calx may be reduced to metal again, by the addition of ſome ſulphur: but I believe no one will ſay the charcoal, in the reduction, refunds the mercurial principle to them.

Poſſibly it may here be aſked me, what indication there is of any remaining ſulphur in well purified regulus of antimony, or its glaſs? I anſwer, no one can doubt of its being in the regulus, who knows, that the beſt antimonial regulus will deflagrate with nitre, in a red-hot crucible, and give off more or leſs of ſulphureous ſcoriæ; that flux'd with a fix'd alkali-ſalt, it will form a kind of hepar antimonii; and that ſulphur may be eaſily ſeparated from it, when diſſolved in aqua regia. But this is obvious; the ſulphur indeed is not ſo readily diſcovered in glaſs of antimony, but 'tis evidently there; for when that glaſs is finely powdered, levigated, and digeſted with very ſtrong diſtilled vinegar, it tinges it very highly, and imparts to it an emetic quality: and this tincture, evaporated to an extract, gives off the ſulphureous tincture to rectified ſpirit of wine: but, if this ſame glaſs is thus ſeveral times treated with freſh diſtilled vinegar, or its concentrated ſpirit, at length it neither gives it any tincture, or emetic power, but remains a dead, dark-coloured, inert maſs, all the ſulphur being extracted, and the glaſs reduced to a mere calx. Beſides, even glaſs of antimony will in ſome meaſure deflagrate with nitre; which ſhews, that it ſtill retains ſome of the ſulphureous principle; and, in order to render it mild and innoxious, 'tis neceſſary to correct it by burning off the ſulphur of the glaſs with nitre, or by the burning-glaſs: which is in truth the deſtruction of the metallic conſiſtence in the glaſs.

But it is a much more difficult thing to prove the exiſtence of the reguline ſpicula in the glaſs of antimony, in the very form of which I ſeem, in a great meaſure, to have placed its emetic quality; and yet glaſs of antimony is the moſt violent of all its preparations. I confeſs, the ſpicula, or needles, by no means appear in the glaſs; but they really do ſo, when the glaſs is digeſted, and diſſolved in wine, by laying a drop of the liquor on a plate of glaſs, and then viewing it through a microſcope. And further, vitrum antimonii, reduced to a regulus with a little common ſulphur, appears of a needle-like ſtriated form. And incinerated antimony, when melted with too ſlack a fire, often appears a maſs of half-ſtriated regulus, and half glaſs, ſo little is the difference. The ſalts in common glaſs do not appear, though they are unqueſtionably there, and ſometimes ſo looſely combined with the vitreſcible earth, that wine, kept in glaſs-bottles, made of ſuch ill-prepared vitreous matter, diſſolves ſome of the ſalts, and thence the wine becomes ill-taſted and unwholſome. Moreover, the preparation of the vitrum ceratum antimonii ſeems not a little to confirm the reality of what I have hinted at; for the wax perhaps doth nothing but ſheath up the pointed reguline particles, when melted with them: and this appears the more probable, as a large quantity of brimſtone, melted with white arſenic, ſheaths up the arſenical ſpicula, and renders them incomparably leſs noxious than before: ſo, with a due quantity of ſulphur, glaſs of antimony itſelf is rendered a very mild kind of regulus.

'Tis exceeding difficult to explain the modus operandi of many medicines. Who can ſay, how a grain or two of crude opium cauſes a profound ſleep? or why a very ſmall doſe of cantharides ſo particularly and ſtrongly affects the urinary paſſages? why two or three grains of elaterium operate with more violence than fifty or ſixty of jalap? or why ſuch a very ſmall quantity of glaſs of antimony excites ſuch dreadful vomitings?

But whether the emetic quality of antimony depends on the ſpiculine form, or not, it certainly lies only in the reguline ſubſtance; for not one of the preparations of that mineral is emetic, but when conſiderably impregnated with reguline particles; which, when not inveloped with too much ſulphur, always exert a vomiting faculty; and this, whether given in ſubſtance, or diſſolved in a proper menſtruum, as wine, cyder, vinegar, or the like. Water, as water, draws nothing from an antimonial regulus, as neither touching the ſulphureous or metallic part. Spirit of wine hath no manner of effect on the reguline; but a vegetable ſaponaceous acid acts on both, and draws out the real ſubſtance of the regulus, making as it were a very attenuated liquid tartar emetic, or antimonial ſolution. And thus indeed the vegetable acids act on iron or copper; which neither pure water, nor pure ſpirit, will affect, but are moſt readily diſſolved by wine, cyder, juice of lemons, or the like.

This leads me, however, to make the following obſervations: That though ſimple water is ineffectual in drawing off any thing emetic from pure regulus of antimony, yet certainly rain, or river-water, in ſome meaſure, acts on the body of crude antimony, and extracts from it a milky hue, and a ſulphureous antimonial ſmell and taſte, by being digeſted with it in a very gentle heat of the ſun, or fire. And this water, by the way, ſo impregnated, hath been very often found of great ſervice in cutaneous and other diſorders, when drunk freely. Now, as the watery menſtruum doth unqueſtionably take up ſome of the antimonial ſulphur, it may receive therewith likewiſe ſome of the very fine reguline parts attached to the ſulphur; juſt as almoſt all the natural ſulphureous waters hold alſo ſomething, more or leſs, of ſome other mineral principle, as particularly moſt of them ſomething ferrugineous. And further, whatever may be thought of giving crude antimony in ſubſtance, Kunkel, Hoffman, Geoffroy, and many others, aſſert its great utility in ſeveral diſorders; and, I think, I have ſufficient reaſon to be of their opinion. It is ſcarce to be doubted, but that it is of

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very great ſervice in ſeveral of the diſeaſes of horſes, cattle, &c. and therefore we may very well ſuppoſe, that ſome of the reguline parts paſs with the ſulphureous into the maſs of their blood; and, by parity of reaſon, antimony may as well find its way through the *Vaſa lactea*, &c. of human bodies, and produce very ſalutary effects. I have, for a great many years, given antimony and quickſilver, rubbed into what I call an antimoniated æthiops, with great advantage, in ſeveral caſes, particularly in cutaneous diſorders, obſtructed ſcrophulous glands, rheumatiſms, &c. when the common æthiops had been found much leſs effectual. This I have long ordered to be kept here as an officinal medicine, and to be prepared of crude antimony, exceedingly fine powdered, p. iii; of pure quickſilver, p. iv; of flowers of ſulphur, p. ii. Theſe are to be rubbed into an impalpable black powder: Doſe from ℈ ſs. to ℈ ii.

It lies in my way here, alſo to mention, that though cinnabar of antimony, ſublimed in the uſual way after the butter of antimony, may be very little different in virtue, or compoſition, from the common factitious cinnabar; yet cinnabar of antimony, as now generally made, with æthiops mineral and crude antimony raiſed together, hath undoubtedly ſome of the reguline parts, as well as the ſulphureous, of antimony, which carry them up; for it is well known to chemiſts, how eaſily the flowers of antimony riſe in the common roaſting, where the fire is much leſs than for ſubliming the cinnabar. Now, every one knows, that theſe flowers are of a reguline nature, are ſtrongly emetic, and may be eaſily reduced to an actual regulus. The abundant ſulphur indeed wraps them well up in the cinnabarine preparation: however, I have often obſerved large doſes of cinnabar of antimony create a nauſea and puking, eſpecially on tender ſtomachs. But then, for this very reaſon, this cinnabar of antimony may be, in many caſes, much more effectual than the common factitious, or even than the native cinnabar.

But I come now particularly to make a few obſervations on ſome of the common antimonial preparations.

The common ſtibium, or crude antimony of the ſhops, hath been melted from its groſs ore, into a ſort of conical moulds, or veſſels, like our melting-pots; whence the molten maſs, when taken out cold, ſomewhat reſembles a ſugar-loaf. Now, as in this melting, the more ponderous or metallic part ſubſides to the bottom, or narrow part of the pot, the lighter, or more ſulphureous, remains above; it is a matter of ſome importance in making the regulus antimonii, *&c.* from what part of the cone, or loaf, the antimony is taken; for the nearer the point of the cone the more reguline; and the yield, from a given quantity, thus taken, will be, *cæteris paribus*, much more conſiderable, than if taken near the baſe. This thing ſhould be likewiſe attended to, when antimony is given in ſubſtance, or boiled, or infuſed in diet-drinks, in which it is far from being a uſeleſs ingredient.

I have before taken notice, that when the reguline part of antimony is involved in a great quantity of ſulphur, as in crude antimony, that mineral exerts no emetic or draſtic power: but when the antimony, by long roaſting, or calcination, is depriv'd of great part of this external ſulphur, it acquires more and more of a vomiting quality, as the ſulphur is more and more conſumed. And when this incinerated antimony, as 'tis called, undergoes a further degree of fire, and is fluxed into a regulus, and even yet farther into a kind of glaſs, it is ſo far ſtripped of its ſulphureous covering, that the reguline ſpicula lie as it were naked, and exert the utmoſt violence on the ſtomach, *&c.* . And even before it is turned into a proper regulus, or glaſs, it acquires, after a long and proper roaſting, no ſmall degree of an emetic power, as any one will find, who gives it in ſubſtance, or properly digeſted in wine, or cyder. And though I cannot ſay with Boerhaave, that it is violently emetic, yet I know Hoffman is miſtaken, when he pronounces it quite inactive. This incinerated antimony then, being thus far deprived of its external ſulphur by calcination, is farther diveſted of it by being kept fuſed a conſiderable time in a very ſtrong fire, and converted into glaſs; which almoſt intirely conſiſts of reguline parts, as is manifeſt from its being of a much greater ſpecific gravity than crude antimony, or even than its hepar; and though the regulus lies concealed under a glaſſy form, yet it is ſtill very eaſily reduced into a proper regulus, and therefore, as ſuch, communicates a moſt ſtrongly emetic quality to any menſtruum, which the regulus itſelf would impart it to, as well as being in ſubſtance moſt violently vomitive. Nay, in running calcined antimony into glaſs, if the fire is not briſk, and well managed, part of the very ſame molten maſs runs into regulus, and part into glaſs, ſo little is the difference between them.

Indeed regulus of antimony itſelf cannot be prepared but by deſtroying the external ſulphur: for inſtance, eight parts of crude antimony, ſix parts of crude tartar, and three parts of pure nitre, made into a dry fine powder, muſt be thrown, by ſmall ſpoonfuls at a time, into a red-hot crucible, whence a very great deflagration immediately ſucceeds each projection. At the bottom of the maſs, firſt duly melted by a quick ſtrong fire, the regulus is found ſometimes more, ſometimes leſs, as the fire, *&c.* are managed. 'Tis a neceſſary caution to force down the cruſts, that are apt to form, at the beginning of the fuſion, with an iron rod, or the like. Here a great part of the external antimonial ſulphur is conſumed by the deflagration, and the tartar and nitre being alſo forthwith alkalized by the fire, unite with the remaining ſulphur, and ſo form a kind of hepar ſulphuris, which diſſolves, and takes up likewiſe, much of the reguline ſubſtance; (for liver of ſulphur, melted with any kind of metal, diſſolves it, and even makes a maſs ſoluble in water); ſo that by this proceſs much the greater part of the antimony and ſalts is turned into a ſcoria, or a kind of crocus antimonii, on the top of the regulus; and this eſpecially if the fuſion is long continued. The regulus, thus detached in a great meaſure from the ſulphureous part, becomes very ſtrongly emetic, for the reaſon above aſſigned. Though this is a common method of making regulus of antimony, at leaſt in ſmall quantities; yet it is far from giving ſo large a portion of regulus, as may be had by ſeveral other proceſſes; for it conſumes not only much of the ſulphureous, but alſo of the reguline part, by the violent and repeated deflagrations, which riſe in the form of flame, fume, and flowers, if catched in proper places; and theſe laſt may be eaſily reduced to regulus again. Beſides, the proportion of the ſalts is too great, for, being alcalized, and uniting with the ſulphur, they take up too much of the reguline part, ſo as to leave very little at bottom, if a ſtrong fire is long continued. Much more regulus, in proportion, would have been yielded, if the tartar and nitre had been previouſly fired, and turned into what is called the black flux. But, even in this caſe, the melted maſs ſhould be poured off, or taken from the fire, as ſoon almoſt as it flows very thin; elſe no ſmall part will evaporate by the ſtrength and duration of the fire, which alſo increaſe the proportion of the ſcoria. But a much greater quantity of regulus is produced by melting two parts of clean antimony with one part of iron-filings, or bits of nails, to which alſo one part almoſt of pure dry ſaltpetre ſhould be projected. This proceſs gives almoſt half regulus. Here the nitre in part likewiſe burns off the ſulphur, but 'tis the iron, that chiefly takes up the ſulphur, and unites with it into ſcoria; which, by-the-bye, finely powdered, and duly waſhed, may be uſed with as good or a better effect, than the antimonium martiale cachecticum of Ludovicus. I have repeatly known it very ſerviceable in a leucophlegmatia, and an obſtinate fluor albus.

If crude antimony is firſt calcined by fire, as for making the glaſs, or boiled repeatedly in freſh ſtrong lime-water, much of the ſulphur is carried off, and the ſtibium, thus managed, yields much more regulus in proportion than if crude antimony had been flux'd; but the ſalts, uſed in ſuch caſe, ſhould be very conſiderably leſs in quantity than in the common method, and alſo previouſly reduced to the black flux. Monſieur Geoffroy ſays, the incinerated antimony, melted with about an equal quantity of black ſoap, gives down much more regulus than is to be had by the methods of Kunkel, Stahl, or any other, even nine or ten ounces out of a pound: but I really never tried this method, not having at hand any true black ſoap: perhaps ſome other ſalino-ſulphureous medium would do as well.

Upon the whole, however, this general obſervation may be made, that where only ſmall quantities of ingredients in this, or any other aſſay, are fluxed at a time, there will be always leſs regulus in proportion, than if the proceſs had been made with much larger quantities. Beſides, in truth, there is a great deal of difference in antimony itſelf, ſome abounding with reguline parts much more than others: nay, antimony, from the very ſame loaf, differs in this conſiderably, according as it is taken from the baſis or apex of the cone.

The effects of ſalts in antimony will more fully appear, if we attend to the operation of nitre in preparing the common liver of antimony; *viz.* if equal parts of antimony and nitre, finely powdered, and intimately mixed, are deflagrated, and melted in a crucible, or iron mortar, the product is a liver of antimony, which ſhould be ſeparated from the ſcoria. In this proceſs the ſulphur is firſt of all partly burnt off in the conflagration: and, 2dly, the remainder is eagerly imbibed by the nitre, now alcalized by the intenſe heat, which, by this means, alſo diſſolves,

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and intimately combines with, the reguline part, juſt as common hepar ſulphuris diſſolves and takes up all kinds of metals. That this chiefly depends on the alcalization of the nitre, and its conſequent union with the antimonial ſulphur, and thus forming a diſſolving liver of ſulphur, that combines with the metallic part of the antimony, is evident; for three parts of ſalt of tartar, or pot-aſh, fluxed with two parts of antimony, produce exactly the ſame effect, that is a liver of antimony, without the leaſt admixture or help of any nitre. And it is from the intimate union of ſo large a portion of this hepar ſulphuris with the metallic part, that little or no regulus is depoſited, but only an uniform half-vitrified ſubſtance at the bottom: nay, if it be not ſufficiently fluxed, it gives off no ſcoria. However, if the pot-aſh and antimony are quickly melted with a very briſk ſtrong fire, a bit of regulus, ſometimes more, ſometimes leſs, is found at the bottom. But if a much leſs quantity of the alcalious ſalt is uſed, much leſs of the antimonial ſulphur is taken up, and it ſo forms what is called by Margraaf, Hoffman, and others, regulus medicinalis, that exerts but little emetic power, there being ſulphur enough left to invelope the reguline ſpicula. But when a much larger quantity of fixed alcali ſalts (as about two parts to one of antimony), is blended with it by fuſion, ſo much of the ſulphur is taken up by the ſalt, that little is left to ſheath the reguline parts ſufficiently to prevent their exerting a very draſtic power. The liver of antimony, made in the uſual way, with equal quantities of nitre, looſes almoſt twice as much in the operation, by the deflagration, as that with the fixed alkali; but the latter is not ſo glaſſy, and much more apt to relent by the moiſture of the air. The crocus, however, from either, if perfectly edulcorated, is nearly of the ſame ſtrength. That indeed, prepared with half the quantity of nitre, is conſiderably weaker, as much leſs of the inveloping ſulphur is conſumed, eſpecially where a ſtrong fire is not uſed, and the matter is taken off before the ſcoria have well time to ſeparate. Even the ſcoria of the common regulus of antimony are of the very ſame nature, and a kind of an hepar antimonii, which by a proper flux may be eaſily reduced in part to a regulus: ſo that whether alkalized ſalt-petre, pot-aſh, or ſalt of tartar, are melted with this ſulphureous mineral, a liver of antimony is produced, from which, duly waſhed, a crocus metallorum, or, more properly, antimonii. And as theſe hepatic maſſes are ſoluble in boiling water, the ſolutions let fall an antimonial ſulphur, eſpecially when precipitated with a vegetable or mineral acid: but this ſulphur is always more or leſs impregnated with reguline particles, particularly that of the firſt precipitation, whence it is always conſiderably emetic. Nay, 'tis certain the reguline and ſulphureous parts of antimony may be ſo incorporated with fix'd alcali-ſalts, that the whole, almoſt, of any quantity of antimony, melted with about an equal part of ſalt of tartar, or pot-aſhes, may be thus turned into a kind of ſulphur auratum, as 'tis called; which is itſelf, in truth, no other than a very ſulphureous crocus antimonii. The coheſion however of the ſalt, ſulphur, and regulus, in this hepatic concrete, is eaſily diſſolved by pouring an acid to its ſolution in water,

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which ſtrongly attracting the alcaline ſalt, the ſulphureous and reguline parts ſoon fall to the bottom. Nor are theſe latter very firmly united, as the alcalious ſalt did, during the flux, in ſome meaſure detach the antimonial ſulphur from the reguline parts. It is evident the coheſion is but looſe; otherwiſe ſo great a proportion of ſulphur, as is found in the ſulphur auratum, would, if very intimately combined with the reguline parts, have ſo ſheathed up theſe ſpicula, as to render them incapable of impreſſing any great irritation on the coats of the ſtomach, *&c.* as is ſeen in crude antimony, and its regeneration from ſulphur and regulus. Beſides, though the firſt precipitation of the ſulphur auratum is greatly impregnated with reguline parts, yet the ſecond or third precipitation holds exceedingly few, and is almoſt intirely ſulphureous, and ſcarce at all emetic. If you would have this milder, or more light ſulphur, you ſhould not pour on too much of the precipitating acid at firſt; or rather ſuffer the antimonial lixivium or ſolution to ſtand, for ſome days, expoſed in a cold open air; for thus the impure reguline ſulphur will fall of itſelf; after which you may inſtill the acid as uſual; and, if you do thus, by gentle degrees, in ſmall quantities, after the ſecond or third precipitation, the ſulphur will fall almoſt pure; which ſhews, that the ſulphur in the hepatic ſolution is not very cloſely united with the regulus. By the way, however, as the antimonial lixivium, from the hepar, is ſo fully fraught with reguline particles, and theſe ſo much unſheathed, it is conſtantly more or leſs emetic, notwithſtanding what Monſieur Lemery aſſerts to the contrary. But that is not the only exceptionable thing in that gentleman's elaborate treatiſe on antimony.

As the ſulphur auratum is now very frequently uſed in medicine, more exactneſs ſeems required in its preparation than is commonly practiſed: for certainly the firſt precipitation differs not a little from the ſubſequent, as being of a darker colour, and greater ſpecific gravity, and of courſe more reguline. 'Tis alſo of ſome conſequence how long the ſtibiate lixivium ſtands before the acid is poured on; for by time it will of itſelf drop much of the ſulphureo-reguline ſubſtance; eſpecially if it is kept in an atmoſphere much impregnated with the fumes of vinegar, ſulphur, or the like; and, in ſuch caſe, the ſucceeding precipitate, with an acid, will be much milder, as being leſs metallic, but more ſulphureous. The quantity and quality of the precipitating acid are alſo of conſequence. Vinegar may rather augment the emetic power; and ſpirit of ſalt, or vitriol, may make a precipitate not altogether ſo proper to mix with calomel, as in Dr. Plummer's alterative pill, *&c.* Great care ſhould be taken therefore in the ablution of the ſulphur auratum; for the acid ſalts are not ſo eaſily waſhed off as ſome would imagine, and it cannot be doubted but that ſome of them fall with the precipitate. Who would think ſuch a quantity of ſalts lay hid in the calx of ſilver, precipitated out of a ſolution of it in aqua fortis, by ſea ſalt, which though perfectly waſhed, and altogether inſipid (as is the luna cornea, into which it readily melts) yet two parts of this, intimately mixed with one part of regulus of antimony, and diſtilled, give a moſt cauſtic kind of butter of antimony. But however light and pure the antimonial ſulphur may be deſired, if it doth not in ſome degree participate of the regulus, it can have no more effect than common ſulphur.

The kermes mineral, once altogether as much celebrated (and with as good reaſon), as any antimonial noſtrum now-a-days, is alſo a kind of liver of antimony, and of the ſame nature with ſulphur auratum, though the proceſs in preparation ſeems very different. It is made by boiling crude antimony, powder'd, in a ſtrong lixivium of fixed or alkaliz'd nitre (ſalt of tartar or pot-aſh will do full as well). Here the alcalious ſalts fix on the ſulphur, and unite with it; whence a liquid kind of hepar ſulphuris, which diſſolves, or perhaps more properly takes up, and incorporates with, many of the reguline parts: and thus in reality it becomes a mild ſort of crocus antimonii, as is evident from its having ſome emetic power, and yielding a regulus by a proper flux.

There is another way of making a ſort of kermes mineral, or ſulphur auratum, ſeldom or ever practiſed, though I think really the beſt; and that is, by boiling crude antimony, finely powdered, in a very ſtrong lime-water, for about an hour, and then precipitating the ſtrained decoction with a ſolution of crude tartar, or its cryſtals, in boiling water. This decoction of crude antimony is as limpid as fountain-water, but gathers, by ſtanding, a thin film, moſt beautifully variegated with all the colours of rainbow. However, this perfectly limpid liquor, on the affuſion of a vegetable or mineral acid, immediately becomes turbid, and of a deep ſaffron-colour, and a great deal of an orange-coloured antimonial ſulphur precipitates, juſt as in the common way of precipitating the decoction of the ſcoria of the regulus, or hepar antimonii. Though this ſulphur auratum, as well as the other, like the alchemiſtical gold, ſo much talked of, and expected, by the adepts, is much greater in proſpect than reality; for when duly waſhed, ſeparated, and dried, it ſcarce amounts to the fortieth part of what it ſeemed to be at the time of precipitation. I take this ſulphur to be rather milder, and more fixed, than that from the ſcoria: however, here alſo is an abundance of reguline parts, as is evident from the orange-colour, and the emetic quality, which this alſo poſſeſſes. This decoction may as well be precipitated with juice of lemons or Seville oranges (which give the brighteſt-coloured precipitate); or by a ſolution of ſal ammoniac, or freſh urine: even common ſaliva will do it; for, on taking a ſpoonful of this perfectly limpid decoction into my mouth, it in an inſtant turned intenſely yellow: ſo that not only vegetable and mineral acids will precipitate this antimonial decoction, but likewiſe neutral ſalts.

This decoction of antimony in lime-water ſerves alſo to a further end; for the mineral, thus boiled, may be in a great meaſure deprived of its ſuperficial ſulphur, eſpecially if boiled a ſecond or third time in freſh ſtrong lime-water. And then the powder, well waſhed and dried, is at fit for making regulus, or glaſs of antimony, as when the ſtibium is roaſted and calcined in the common way. And perhaps antimony, thus prepared, may be more effectual in many caſes, than the crude, when given internally:

it often pukes, and purges gently, if given to ten or fifteen grains, eſpecially on the firſt uſe of it.

It appears then, from what hath been ſaid above, that ſulphur auratum, kermes mineral, Ruſſel's powder, or Wilſon's panacea of antimony without fire, are all of the ſame nature, though indeed ſomewhat different in their ſtrength, and pretty uncertain in their operation; and therefore require a careful hand to prepare, and a good head to adminiſter them with advantage. For the reguline principle will be much more predominant in the ſcoriæ of the very ſame kind of regulus of antimony, if it is kept for a long time in a briſk fire, than it would be, if for a much ſhorter time; not to mention what I have ſaid before, as to the manner of precipitating, *&c.* the ſulphur auratum. And kermes mineral differs not a little, as prepared with a ſtronger or weaker lixivium, as more or leſs carefully waſhed and edulcorated, and as ſpirit of wine is, or is not, at laſt deflagrated with it. Whoever would give them, ſhould begin with ſmall doſes, as a grain or two; but, as he finds they agree, may gradually increaſe to eight or ten, eſpecially if they are intimately incorporated with any reſinous extract, natural balſam, or the like. But the doſes ſhould by no means too quickly ſucceed one the other; for ſolid antimonials may lie a conſiderable time in the body without any ſenſible effect, and yet, at length, operate all on a ſudden, with exceeding great violence; particularly when wine, cyder, or any vegetable acid, are ſwallowed upon them.

Though common ſalt, fluxed with antimony, ſeems to do little more than promote its fuſion, and therefore is commonly added, in ſmall quantities, in preparing liver of antimony, and regulus medicinalis, yet its highly concentrated acid hath a very peculiar effect on the reguline ſubſtance, rendering it not only much more volatile, but likewiſe exceſſively cauſtic, as is ſeen in common butter or oil of antimony; for, in this preparation, the ſublimate corroſive contributes nothing but its moſt highly dephlegmated and moſt penetrating acid ſalt, which the regulus more ſtrongly attracts than the mercury; and theſe, uniting, form a moſt corroſive liquid, which comes over by diſtillation; from which is precipitated, by the affuſion of common water, what is very improperly called mercurius vitæ, as it hath nothing of mercury in it but the name, and is, in truth, when duly edulcorated with boiling water, a mere regulus antimonii, as plainly appears when it is melted. Though there are ſeveral other ways (and theſe too leſs dangerous) of making butter of antimony; yet this proceſs with ſublimate corroſive ſhews the regulus naked as it were, when precipitated, and the antimonial ſulphur left behind with the mercury, which are eaſily ſublimed into cinnabar: ſo that this alſo confirms the above doctrine; for with well purified regulus antimonii and ſublimate corroſive no cinnabar can be prepared; there being no more ſulphur in the regulus than is barely neceſſary to preſerve the metallic form and conſtitution.

I have but ſeldom uſed mercurius vitæ in my practice, and that many years ago in ſome maniacal caſes: it always proved a very churliſh medicine, and I ſoon grew weary of it. If any one is inclined

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to try any thing of this kind, I would recommend a preparation of the celebrated Dr. Stahl; *viz.* pour by little at a time, and ſlow degrees, near treble the quantity of good alcohol vini on rectified butter of antimony: as a conſiderable heat at firſt ariſes on the mixture, it immediately grows milky, and a very white gelatinous kind of maſs ſoon precipitates. This digeſted for a day or two, in a very gentle heat, then ſufficiently edulcorated with boiling water, dried and deflagrated with ſpirit of wine, gives a powder much ſofter in operation than the common mercurius vitæ, though ſtill emetic, and, as the Profeſſor ſays, greatly ſudorific and anodyne. The doſe three or four grains. I find it ſweats very largely, eſpecially when it operates little by vomit, or ſtool, as indeed moſt of the draſtic antimonials will do. Maets recommends another preparation of mercurius vitæ, under the title of purgans ex antimonio ſecuriſſimum; which is made by melting one part of mercurius vitæ with two parts of nitre, and then well grinding this maſs with an equal quantity of common ſalt. This done, let the ſalt be well waſhed off, and the maſs well edulcorated. This indeed I find ſo ſecure a medicine, that it differs very little in virtue from common bezoar mineral: the reaſon will eaſily appear to any one, who conſiders the following obſervations:

Antimonium diaphoreticum, and ceruſs of antimony, are little more than the dead aſhes of that mineral, deprived of its internal or metallizing ſulphur by repeated deflagrations with ſalt-petre; ſo that I think little can be expected from them in a medicinal way, both the one and the other being an inactive calx, in which the reguline form and contexture are quite deſtroyed; inſomuch that aqua regia, which acts ſo readily on crude antimony, or its regulus, will not touch thoſe, much leſs diſſolve them: an argument, that the metallic nature of the antimony is greatly deſtroyed in theſe preparations. And though they are both reducible, by a proper flux, to regulus again, yet never without the addition of ſome phlogiſton, or ſulphureous ſubſtance. And thus indeed may any calx of antimony, prepared in the humid or dry way, be converted into regulus by fluxing in cloſe veſſels with ſome inflammable ingredient: which ſhews, that both the form and virtue of the regulus depend, in a great meaſure, on the ſulphureous principle, as well as the metallic earth. I know not whether it may be here worth noting by the way, that antimonial calx, reduced with mineral ſulphur, takes a ſtriated form; but with an animal or vegetable phlogiſton the luminous appearance of common regulus of antimony. Is this from the vitriolic acid only? Mercurius vitæ, fluxed *per ſe*, hath alſo this aculeated or needle-like appearance: whence?

This likewiſe is really the caſe in the moſt perfect metallic bodies, which looſe their metalleity, as Becher calls it, as malleability, and other metallic properties, by an intire deſtruction of their internal metallic or combining ſulphur, as is ſeen when metals are calcined by the burning-glaſs, or an intenſe culinary fire. This internal ſulphur is probably what Albertus Magnus means by the humidum unctuoſum ſubtile, which, he ſays, is the prima materia metallorum, and is intirely analogous to the combining ſulphur, or oil of vegetables, which binds the

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very particles of the ſtamina, and organiſed parts together, and which, when totally burnt off, leaves the whole in aſhes. But here, by the way, it ſeems evident, that the ſulphureous pabulum, ſo neceſſary to the reduction of an antimonial calx, is very different from the very ſubſtance of light, or fire: for though a vaſt deal of the actual light, or fire, adheres to the calx, as is manifeſt from the great augmentation of weight in calcining regulus of antimony by the ſun-beams, or a culinary fire, yet it by no means contributes to its metallic ſtate; on the contrary it quite deſtroys it; and the ſun-beams, or particles of fire, do not combine, but ſcatter, the reguline or metallic parts, by deſtroying the bond of union, the internal ſulphur. In like manner oil of vitriol, or ſpirit of nitre, two concentrated and exceedingly fiery acids, tear abroad regulus of antimony, and reduce it to a calx, by letting looſe the phlogiſton, or ſulphureous principle, whence the metallic ſubſtance is quite decompoſed. And that this is the caſe, ſeems evident from the very ſtrong ſulphureous ſmell, that ariſes, when theſe acids are poured on antimony. Indeed oil of vitriol takes up the inflammable part of antimony, and unites with it into an actual mineral ſulphur. It ſeems then, that theſe fiery acids act on antimony very nearly in the ſame manner as the ſun-beams, or actual fire; and this is one argument, amongſt many others, of the very great affinity between light and acids; which Sir Iſaac Newton long ago hinted.

That the deſtruction of the internal ſulphur of the reguline ſubſtance, in theſe calcinations, is the deſtruction of the reguline form, and of courſe of the

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emetic power of the antimony, appears in part from what I have ſaid above, and will be more manifeſt by attending to the following experiments. If merely equal quantities of antimony and nitre are deflagrated, and melted together, only ſo much of the external inveloping ſulphur is conſumed, as to leave the reguline ſpicula naked, and capable of very ſtrongly irritating the coats of the ſtomach, *&c.* But if three parts of nitre are taken to one of antimony, by the repeated ſtrong deflagration, not only the external but the internal ſulphur alſo is totally diſſipated, and the maſs reduced to an inert calx. Thus likewiſe iron, tin, and copper, with a double or treble quantity of nitre, are reduced to aſhes, and demetallized. A little more than two parts of pure nitre to one of regulus antimonii reduces it to an innoxious calx, as there is much leſs ſulphur to be burnt off in the regulus than in the crude antimony: and about an equal quantity of ſalt-petre quite deſtroys the virulence of glaſs of antimony, as in it there remained only juſt ſulphur enough to preſerve the reguline nature. So five parts of nitre to two of mercurius vitæ convert it into an active ſubſtance, or kind of bezoar mineral. But of this enough—What nitre doth by deflagration, the burning-glaſs doth by the intenſe force of the concentrated ſun-beams; by which antimony, its regulus, and glaſs, are turned to a mere calx, the whole of the ſulphur being quite burnt up. Nay, when any of theſe are a long time expoſed to the action even of a common ſtrong fire, they are reduced to mere aſhes, which can neither be run into regulus or glaſs again, but by the help of ſome phlogiſton, as animal, vegetable, or mineral ſulphur.

And the ſame is neceſſary to the reduction of the calx of iron, tin, copper, *&c.* That there remains no ſulphur in any antimonial calx, ſo prepared, is manifeſt, in that no one of them will deflagrate with nitre, nor be reduced to a reguline ſtate, without adding ſome phlogiſton. That the reguline nature and contexture are deſtroyed in theſe preparations, appears in that they are not at all acted upon by aqua regia, which ſo perfectly and readily diſſolves any antimonial regulus: and hence alſo they are utterly devoid of an emetic quality.

But in all theſe calcinations with nitre, three parts at leaſt of that ſalt muſt be uſed to one of the crude antimony, or the internal ſulphur will not be ſufficiently burnt off, and the reguline ſpicula ſo far deſtroyed as to leave an inert calx: for if two parts only of ſalt-petre are employed, it proves ſtill emetic, as is ſeen in what Boerhaave calls antimonii emeticum mitius: ſo alſo if the nitre be conſiderably reduced, in the preparation of the ceruſs of antimony, that likewiſe will remain very draſtic. If equal quantities of nitre and glaſs of antimony are expoſed for ſome time, in a clean crucible, to a briſk fire, a very beautiful calx, or diaphoretic antimony, comes out, but altogether inactive: if two-thirds however, or half only, of nitre is uſed, the calx is nothing ſo white (the ſulphur not being quite burnt off); and thence it remains ſtill emetic, eſpecially if only half ſalt-petre is projected with the antimony.

Upon this foundation may be made ſeveral ſorts of antimonial powders, more or leſs active, as more or leſs nitre is uſed; which, prepared with care, and given with judgment, may prove of conſiderable ſervice in medicine, much more ſo ſurely than the common antimonium diaphoreticum, or ceruſs of antimony.

But, in all theſe calcinations, not only the quantity, but the quality alſo, of the ſalt-petre ſhould be well conſidered; for ſome nitre greatly abounds with common ſalt, and hence leſs corrects, as it is called, or rather deſtroys, the regulus.

But I greatly prefer the infuſion of the glaſs, regulus, or crocus of antimony, in ſound generous wine, to any other preparation of that mineral, as by far the moſt certain, ſafe, and effectual; and the vinum antimoniale made with the glaſs, or regulus, I think the beſt: for unleſs the liver of antimony is carefully prepared with a due quantity of nitre, and a proper degree of fire, it cannot be depended on, as being ſometimes ſtronger, ſometimes weaker, and ſometimes it throws up no ſeparable ſcoriæ; which makes it, *cæteris paribus*, conſiderably weaker. Beſides, the hepar ſhould be finely powdered, and well edulcorated with repeated ablutions (or rather decoctions) in hot water; otherwiſe much of the alcalized nitre will adhere to the hepatic crocus, and enervate the power of the vinous menſtruum. This was not formerly attended to ſo much as it ought to have been; and I well remember, when the vinum benedictum, as then called, was ſtrangely different the one from the other. Certainly, when prepared with true glaſs of antimony, or pure regulus, there is not this uncertainty. If the martial regulus is uſed, it may in ſome ſmall degree alſo participate of a ferrugineous principle. The wine ſhould be always carefully filtered, after ſufficient infuſion. In this infuſion of the glaſs or regulus of antimony on wine, the reguline ſubſtance is diſſolved by that ſaponaceous ſpirituous, tartareous menſtruum, and the reguline part becomes moſt highly attenuated; otherwiſe it would not ſo readily paſs with the wine through the cloſeſt filtre, and remain ſo long ſuſpended, and intimately incorporated with the wine, and ſo remain for years together. So that antimony, ſo prepared, is in ſolutis principiis, as it were; or rather is thus rendered a kind of highly ſubtilized liquid tartar emetic, which poſſeſſes the whole power and virtue of ſtibium, as it is potent enough to give a very ſtrong irritation to the ſtomach and inteſtines, if taken to the quantity of an ounce or two; and yet, in a ſmaller doſe of two or three drachms, it only cauſes a nauſea, gentle puke, and a ſtool or two, if neither a ſweat, or very high perſpiration: but, from thirty to ſixty or eighty drops, it generally proves merely an alterative and diaphoretic, paſſing through the inmoſt receſſes, and ultimate ramifications, of the whole vaſcular ſyſtem, with little or no diſturbance to nature, and yet evidently promotes all the animal ſecretions and excretions, particularly thoſe of the ſkin, inteſtines, urinary paſſages, and ſalival ducts, by gently irritating the whole nervous and vaſcular compages.

As this antimonial wine then ſo readily mixes with the blood and animal humours, and paſſes off ſo freely and eaſily through all the outlets of the body, it may be given with ſafety, and repeated with ſucceſs, two, three, or even four times in twenty-four hours, in ſmall doſes, and ſo continued for days together: whereas the ſolid antimonial preparations are very uncertain in their operation, ſometimes lying a long time in the ſtomach and bowels before they exert any ſenſible effect; and then, at once, irritating with ſo much violence and obſtinacy, that the patient is too often quite exhauſted before the force of the antimonial. And this is not a little to be feared, and ſometimes actually happens, when kermes mineral, ſulphur auratum, crocus antimonii mitior, and even regulus medicinalis, and other ſtibiate powders, or pills, are given, and too ſoon and frequently repeated, as every one muſt know, who hath freely dealt in ſuch ſort of medicines; a hypercatharſis ſometimes, all at once, and unexpectedly, coming on, eſpecially on drinking a glaſs of wine, cyder, or other vegetable acids.

Beſides, when antimonials are given in ſubſtance, they muſt firſt undergo a diſſolution in the ſtomach, before they can paſs the lacteals, and be mixed with the blood, ſo as to act as alteratives, diaphoretics, *&c.* Now, in this liquid preparation the reguline part is already diſſolved, and moſt exquiſitely attenuated, ſo that it paſſes into the blood with the utmoſt facility. It ſhould be moreover obſerved, that, in this form, antimony may be given in the moſt agreeable manner, without even being perceived, or creating any more diſtaſte than the wine it was made on. A thing of ſome conſequence truly, when we have to do with ſqueamiſh patients, particularly with children, to whom it may be neceſſary to give repeated doſes of the medicine. It is certainly then much in favour of this preparation, that it is ſo agreeable, and may be ſo eaſily concealed, and given in any proper liquor; and this, I ſay, to children, as well as grown perſons.

There is many times the ſtrongeſt indication for puking and purging them, and yet it is extremely difficult to give them the common medicines uſual on ſuch occaſions; whereas the antimonial wine may be given in their common drink with the utmoſt eaſe and ſafety. I have very frequently given it with ſucceſs, from ten to thirty drops, to children of a year or two old, in the chin-cough, and aſthmatic oppreſſions, when an attempt to force down more nauſeous medicines had endangered a ſuffocation and convulſions.

Should it be imagined, that this medicine, being ſo ſafe and eaſy, can have no great efficacy as an alterative and diaphoretic; I anſwer, that as it is capable, in a proper doſe, of irritating the ſtomach and inteſtines ſo ſtrongly, it cannot be ſuppoſed, even in very ſmall doſes, to lie inactive in the ſanguineous and lymphatic arteries; and both ſeems, and eventually is, exceedingly well adapted to ſtimulate and ſcour the whole vaſcular ſyſtem. In confirmation of this, we find, that when a pretty large doſe of the eſſence of antimony is given, as three or four drachms, for inſtance, a large ſweat almoſt always ſucceeds, if it is not immediately thrown up by vomit. By thus keeping up then, and quickening, the action of the veſſels on the contained fluids, the general circulation of the humours is moſt effectually promoted; and indeed ſome ſuch a ſtimulus is very often highly neceſſary in the ultimate ramifications of the ſanguineous, ſerous, and lymphatic arteries, where the motion is naturally exceeding ſlow, and where ſtagnation, and conſequent corruption of the ſerum and lymph, are very apt to generate a putrid colluvies. I think one of the uſes of ſalts of all kinds, eſpecially of common ſalt, is to act as a general ſtimulus; and hence the moderate uſe of it is ſo ſalutary. By thus univerſally ſtimulating therefore not only the greateſt, but alſo the ſmalleſt veſſels of the body, this medicine greatly tends to remove all obſtructions formed, or forming, even in the minuteſt canals; and hence moſt ſucceſsfully promotes the natural ſecretions and excretions; in which, duly performed, health itſelf conſiſts.

In obſtinate rheumatiſms then, in cold ſcorbutic affections, in moſt cutaneous diſeaſes, in aſthmatic, leucophlegmatic, and icteric diſorders, in old ſtubborn head-aches, vertigo, epilepſy, and mania, antimonials are very uſeful, and the vinum antimoniale in particular. In my own practice I have had numerous inſtances of its ſucceſs in the above caſes, and have likewiſe had the pleaſure of finding it ſucceſsfully uſed by ſeveral eminent practitioners.

Let me further add, before I quit the ſubject, that I very frequently give this antimonial wine, or eſſence of antimony, as I call it, in ſome acute as well as chronic diſorders, and particularly in ſlow fevers, low irregular intermittents and remittents, in catarrhal fevers, in a peripneumonia notha, and even in a true peripneumony, after proper evacuations, towards the cloſe, when the ſpitting is prematurely ſuppreſſed, and great anxiety and difficulty of breathing come on. In like circumſtances, it is very proper in the ſmall-pox alſo; and I have had the ſatiſfaction, through divine goodneſs, of ſeeing it many times very happily ſucceed in many deſperate caſes; the expectoration returning ſometimes with a gentle

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vomiting, ſometimes a ſtool or two, and ſometimes a univerſal kindly ſweat. The kermes mineral was formerly given in ſuch caſes with aſtoniſhing ſucceſs, and operated much in the ſame manner: however, I well know the eſſence of antimony is much more ſafe and certain; though the powder had a ſupriſing reputation in France and Germany, about thirty or forty years ago, and with juſtice too, when properly timed and doſed; but the too precipitate and injudicious uſe of it ſoon brought it into diſrepute. And this is generally the fate of all empirical medicines, which are cried up as good in all caſes, and at all times; for, though they may be really good in themſelves, under a proper adminiſtration, yet the indiſcriminate and imprudent uſe of them too often renders them poiſons inſtead of antidotes; as hath, in truth, been the caſe with ſome more modern arcana.

To conclude, I do not pretend that the obſervations I have here laid down are altogether new; I allow that far the greater part of them are commonly known, and as ſuch I produce them, without particular quotations from particular authors, or ſetting down proceſſes at large, which may be eaſily conſulted in the common books of chemiſtry; knowing alſo that there are ſeveral other ways of working, in the great way, much more commodious and cheap, by ſaving ſaltpetre, *&c.* But, if I miſtake not, I have, in ſome meaſure, given a new light into the nature of ſtibium; at leaſt have made it more obvious to the younger part of ſuch, whoſe buſineſs it is to prepare and exhibit antimonals, than they will readily find in any one ſingle treatiſe. And, as ſtibiate medicines are now ſo much in vogue, this little piece may not be an improper thing to be put into the hands of ſtudents in phyſic: perhaps it may excite even ſome of the more experienced to improve and aſcertain the virtues and doſes of antimonials, which at preſent are not a little undetermined.

Beſides, I had alſo a further view in drawing it up, which is to recommend the uſe of what I have called eſſence of antimony, or the vinum antimoniale (for the aromatic in it is of no great importance), as much the moſt ſafe and uſeful preparation thereof. I have uſed a great variety of antimonial medicines for near thirty years; and muſt ſay, from ſufficient experience, I greatly prefer this to any other; though I am far from condemning all the ſolid preparations of antimony; but I aſſert no one of them hath greater or better effects in medicine than this; and very few, if any, can be given with equal ſafety. I think I may ſay of many of them, in the words of Celſus, "His varie medici utuntur, "ut magis, quid quiſque perſuaſerit ſibi, appareat, "quam quid evidenter compererit."

But, after all, it is not this or that medicine, or preparation, will cure a diſeaſe, unleſs prudently made uſe of. A man may as perfectly well know how to make a hatchet, a hammer, or a ſaw, as a chemiſt how to make ſuch or ſuch particular medicines; and yet the firſt may be as far from being a good carpenter, as the ſecond from being a good phyſician: the arcanum is how to uſe them.